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0000:           1 * EXPLORER -- A FROBCO PROGRAM TO EXPLORE THE OPERATION OF THE VCS GAME PLAYER
0000:           2 * COPYRIGHT 1982 BY FROBCO -- ALL RIGHTS RESERVED
0000:           3 *
0000:           4 * VERSION 1.3 -- LAST MODIFIED  2/5/83
0000:           5 *
0000:           6 *
0000:           7 * SYSTEM DEFINITIONS
0000:           8 *
0000:           9 VSYNCH  EQU  0         ; WRITE A 2 HERE TO CAUSE VERTICAL SYNCH PULSE (ONCE PER
0001:          10 VRESET  EQU  1         ; RESET VIDEO ONCE PER SCREEN
0002:          11 LWAIT   EQU  2         ; WRITE ANYTHING HERE TO WAIT TO END OF CURRENT LINE
0003:          12 VID03   EQU  3         ; NOT USED WITH NORMAL NTSC HORIZONTAL TIMING
0004:          13 P1VMOD  EQU  4         ; PLAYER1 VIDEO MODE REGISTER
0005:          14 P2VMOD  EQU  5         ; PLAYER2 VIDEO MODE REGISTER
0006:          15 P1COLOR EQU  6         ; PLAYER 1 COLOR REGISTER
0007:          16 P2COLOR EQU  7         ; PLAYER 2 COLOR REGISTER
0008:          17 OCOLOR  EQU  8         ; OBJECT COLOR REGISTER
0009:          18 BCOLOR  EQU  9         ; BACKGROUND COLOR REGISTER
000A:          19 FVMODE  EQU  $0A       ; FIELD VIDEO MODE REGISTER
000B:          20 P1FLIP  EQU  $0B       ; PLAYER1 FLIP REGISTER & READ FIRE BUTTON
000C:          21 P2FLIP  EQU  $0C       ; PLAYER2 FLIP REGISTER & READ FIRE BUTTON
000D:          22 FLDAIM  EQU  $0D       ; OBJECT FIELD A IMAGE REGISTER
000E:          23 FLDBIM  EQU  $0E       ; OBJECT FIELD B IMAGE REGISTER
000F:          24 FLDCIM  EQU  $0F       ; OBJECT FIELD C IMAGE REGISTER
0010:          25 P1HRES  EQU  $10       ; WRITE HERE TO RESET PLAYER1 HORZ POS TO 0
0011:          26 P2HRES  EQU  $11       ; WRITE HERE TO RESET PLAYER2 HORZ POS TO 0
0012:          27 S1HRES  EQU  $12       ; WRITE HERE TO RESET PLAYER1 SHOT HORZ POS TO 0
0013:          28 S2HRES  EQU  $13       ; WRITE HERE TO RESET PALYER2 SHOT HORZ POS TO 0
0014:          29 S3HRES  EQU  $14       ; WRITE HERE TO RESET SHOT3 HORZ POS TO 0
0015:          30 SND1MD  EQU  $15       ; SOUND MODE REGISTER FOR PLAYER 1
0016:          31 SND2MD  EQU  $16       ; SOUND MODE REGISTER FOR PLAYER 2
0017:          32 SND1TN  EQU  $17       ; SOUND TONE REGISTER FOR PLAYER 1
0018:          33 SND2TN  EQU  $18       ; SOUND TONE REGISTER FOR PLAYER 2
0019:          34 SND1AM  EQU  $19       ; SOUND AMPLITURE REGISTER FOR PLAYER 1
001A:          35 SND2AM  EQU  $1A       ; SOUND AMPLITUDE REGISTER FOR PLAYER 2
001B:          36 P1IMAG  EQU  $1B       ; VIDEO IMAGE FOR PLAYER 1
001C:          37 P2IMAG  EQU  $1C       ; VIDEO IMAGE FOR PLAYER 2
001D:          38 P1SHOT  EQU  $1D       ; WRITE 2 HERE TO ENABLE SHOT1 IMAGE
001E:          39 P2SHOT  EQU  $1E       ; SAME AS ABOVE BUT FOR SHOT 2
001F:          40 S3SHOT  EQU  $1F       ; SAME AS ABOVE BUT FOR SHOT 3
0020:          41 P1HORZ  EQU  $20       ; HORIZONTAL FINE INCREMENT FOR PLAYER1
0021:          42 P2HORZ  EQU  $21       ; HORIZONTAL FINE INCREMENT FOR PLAYER2
0022:          43 S1HORZ  EQU  $22       ; HORIZONTAL FINE INCREMENT FOR SHOT1
0023:          44 S2HORZ  EQU  $23       ; HORIZONTAL FINE INCREMENT FOR SHOT2
0024:          45 S3HORZ  EQU  $24       ; HORIZONTAL FINE INCREMENT FOR SHOT3
0025:          46 P1DELAY EQU  $25       ; CONTROLS DELAY FROM WHEN P1 IMAGE IS WRITTEN TO WHEN SHOWN
0026:          47 P2DELAY EQU  $26       ; CONTROLS DELAY FROM WHEN P2 IMAGE IS WRITTEN TO WHEN SHOWN
0027:          48 VID27   EQU  $27
0028:          49 S1CONT  EQU  $28       ; SHOT 1 CONTROL REGISTER
0029:          50 S2CONT  EQU  $29       ; SHOT 2 CONTROL REGISTER
002A:          51 HZSCRL  EQU  $2A       ; WRITE HERE TO ADVANCE PLAYER AND SHOT HORZ SCROLE
002B:          52 NOINC   EQU  $2B       ; WRITING HERE STOPS HOIZONTAL INCREMENT OF ALL SPRITES
002C:          53 COLRES  EQU  $2C       ; WRITE HERE TO RESET COLLISION REGISTERS
002D:          54 VID2D   EQU  $2D
002E:          55 VID2E   EQU  $2E
002F:          56 VID2F   EQU  $2F
0030:          57 PS1COL  EQU  $30       ; BIT 7 SET IF S1+P2, BIT 0 SET IF S1+P1
0031:          58 PS2COL  EQU  $31       ; BIT 7 SET IF S2+P1, BIT 0 SET IF S2+P2
0032:          59 P1OCOL  EQU  $32       ; BIT 7 SET IF OBJ+P1, BIT 0 SET IF S3+P1
0033:          60 P2OCOL  EQU  $33       ; BIT 7 SET IF OBJ+P2, BIT 0 SET IF S3+P2
0034:          61 S1OCOL  EQU  $34       ; BIT 7 SET IF OBJ+S1, BIT 0 SET IF S3+S1
0035:          62 S2OCOL  EQU  $35       ; BIT 7 SET IF OBJ+S2, BIT 0 SET IF S3+S2
0036:          63 S3OCOL  EQU  $36       ; BIT 7 SET IF OBJ+S3
0037:          64 PPCOL   EQU  $37       ; BIT 7 COMES BACK SET IF PLAYER 1 COLLIDES WITH PLAYER 2
0038:          65 PDL5L   EQU  $38       ; BIT 7 IS PIN 5 ANALOG FROM LEFT PADDLES
0039:          66 PDL9L   EQU  $39       ; BIT 7 IS PIN 9 ANALOG FROM LEFT PADDLES
003A:          67 PDL5R   EQU  $3A       ; BIT 7 IS PIN 5 ANALOG FROM RIGHT PADDLES
003B:          68 PDL9R   EQU  $3B       ; BIT 7 IS PIN 9 ANALOG FROM RIGHT PADDLES
003C:          69 LFTFR   EQU  $3C       ; BIT 7 CLEAR IF LEFT FIRE BUTTON DOWN
003D:          70 RGHFR   EQU  $3D       ; BIT 7 CLEAR IF RIGHT FIRE BUTTON DOWN
003E:          71 VID3E   EQU  $3E
003F:          72 VID3F   EQU  $3F
0000:          73 *
0000:          74 *
0000:          75 * NOW THE 6532 REGISTERS
0000:          76 *
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0280:          77 CTROLS  EQU  $280      ; READ THIS FOR THE JOY STICK BITS
0281:          78 DDRA    EQU  $281      ; DATA DIRECTION REGISTER FOR THE ABOVE PORT
0282:          79 SWTCHS  EQU  $282      : READ THIS FOR THE CONSOL SWITCH BITS
0283:          80 DDRB    EQU  $283      ; DATA DIRECTION REGISTER FOR THE ABOVE PORT
0284:          81 RTIME   EQU  $284      ; READ THE TIMER
0000:          82 *
0294:          83 TIM1    EQU  $294      ; WRITE HERE TO SET TIMER FOR 1/1
0295:          84 TIM8    EQU  $295      ; WRITE HERE TO SET TIMER FOR 1/8
0296:          85 TIM64   EQU  $296      ; WRITE HERE TO SET TIMER FOR 1/64
0297:          86 TIM1024 EQU  $297      ; WRITE HERE TO SET TIMER FOR 1/1024
0000:          87 *
0000:          88 *
0000:          89 * RAM ASSIGNMENTS
0000:          90 *
0080:          91 SCREENS EQU  $80       ; SCREEN COUNTER GOING FROM 0 TO 59
0081:          92 SECONDS EQU  SCREENS+1 ; SECOND COUNTER INCREMENTED EVERY 60 SCREENS
0082:          93 TARL    EQU  SECONDS+1 ; LOW ORDER INDIRECT USED BY FMON
0083:          94 TARH    EQU  TARL+1    ; HIGH ORDER INDERECT USED BY FMON
0084:          95 COMCOD  EQU  TARH+1    ; COMMAND CODE HOLDING REGISTER USED BY FMON
0085:          96 VLNCT   EQU  COMCOD+1  ; VERTICAL LINE COUNTER
0086:          97 SPREG   EQU  VLNCT+1   ; TEMP STORE USED FOR THE STACK POINTER
0087:          98 DIGCON  EQU  SPREG+1   ; DIGIT CONTROL REGISTER
0088:          99 TOPCON  EQU  DIGCON+1  ; CONTROL REG FOR THE TOP OF SCREEN
0089:         100 P1HS    EQU  TOPCON+1  ; HORIZONTAL POSITON OF PLAYER1
008A:         101 P2HS    EQU  P1HS+1    ; HORIZONTAL POSITION OF PLAYER2
008B:         102 S1HS    EQU  P2HS+1    ; HORIZONTAL POSITION OF PLAYER 1 SHOT
008C:         103 S2HS    EQU  S1HS+1    ; HORIZONTAL POSITION OF PLAYER 2 SHOT
008D:         104 TREG1   EQU  S2HS+1    ; THE TREG GROUP IS USED TO HOLD IMAGES TO BE DISPLAYED
0093:         105 TREG2   EQU  TREG1+6   ; AT THE TOP OF THE SCREEN.
0099:         106 TREG3   EQU  TREG2+6
009F:         107 TREG4   EQU  TREG3+6
00A5:         108 SMODE   EQU  TREG4+6   ; SCREEN MODE REGISTER
00A6:         109 MODE1   EQU  SMODE+1   ; VID MODE 1 REGISTER
00A7:         110 MODE2   EQU  MODE1+1   ; VID MODE 2 REGISTER
00A8:         111 EBITS   EQU  MODE2+1   ; TEMP STORAGE FOR THE ENABLE BITS
00A9:         112 TMCNT   EQU  EBITS+1   ; IN BETWEEN SCREEN TIME COUNT
00AA:         113 SPTS    EQU  TMCNT+1   ; PARTS OF THE SCREEN FUNCTIONS TO DO
00AB:         114 P1CR    EQU  SPTS+1    ; PLAYER1 COLOR (TOP 4 BITS CHROMA LOWER 4 BITS LUMA)
00AC:         115 P2CR    EQU  P1CR+1    ; PLAYER2 COLOR
00AD:         116 BKCR    EQU  P2CR+1    ; BACKGROUND COLOR
00AE:         117 OBJCR   EQU  BKCR+1    ; OBJECT COLOR
00AF:         118 P1VERT  EQU  OBJCR+1   ; PLAYER1 VERTICAL POSITION REGISTER
00B0:         119 P2VERT  EQU  P1VERT+1  ; PLAYER2 VERTICAL POSITION REGISTER
00B1:         120 S1VERT  EQU  P2VERT+1  ; SHOT 1 VERTICAL REGISTER
00B2:         121 S2VERT  EQU  S1VERT+1  ; SHOT 2 VERTICAL POSITION REGISTER
00B3:         122 P1IMG   EQU  S2VERT+1  ; PLAYER1 IMAGE ARRAY
00BB:         123 P2IMG   EQU  P1IMG+8   ; PLAYER2 IMAGE ARRAY
00C3:         124 OBJAVT  EQU  P2IMG+8   ; OBJECT A VERTICAL POSITION
00C4:         125 OBJAIM  EQU  OBJAVT+1  ; OBJECT A IMAGE ARRAY
00CC:         126 OBJBVT  EQU  OBJAIM+8  ; OBJECT B VERTICAL POSITION
00CD:         127 OBJBIM  EQU  OBJBVT+1  ; OBJECT B IMAGE ARRAY
00D5:         128 OBJCVT  EQU  OBJBIM+8  ; OBJECT C VERTICAL POSITION
00D6:         129 OBJCIM  EQU  OBJCVT+1  ; OBJECT C IMAGE ARRAY
00DE:         130 OBJXIM  EQU  OBJCIM+8  ; ARRAY USED IN 48 BIT DISPLAY
00E6:         131 TP1     EQU  OBJXIM+8  ; TIMING PARAMETER 1
00E7:         132 TP25    EQU  TP1+1     ; TIMING PARAMETER 25
00E8:         133 TP26    EQU  TP25+1    ; TIMING PARAMETER26
00E9:         134 TEMP1   EQU  TP26+1    ; TEMPORIES
00EA:         135 TEMP2   EQU  TEMP1+1
0000:         136 *
0000:         137 *
0000:         138 *
0000:         139 * START OF PROGRAM - LOAD AT $F000
----- NEXT OBJECT FILE NAME IS EXPLORER.OBJ0
F000:         140         ORG  $F000
F000:         141 *
F000:A2 FF    142 START   LDX  #$FF      ; HERE ON RESET SO SET UP THE STACK POINTER
F002:9A       143         TXS
F003:D8       144         CLD              ; CLEAR DECIMAL MODE
F004:A2 00    145         LDX  #0        ; DO A MASSIVE MEMORY CLEAR
F006:A9 00    146         LDA  #0
F008:95 00    147 CLOOP   STA  0,X
F00A:CA       148         DEX
F00B:D0 FB    149         BNE  CLOOP
F00D:         150 *
F00D:         151 *
F00D:         152 *     MAIN RAM INITIALIZATION
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F00D:           153 *
F00D:A9 03      154         LDA  #3        ; SET UP FOR  PLAYER1 AND PLAYER2 DISPLAY AT FIRST
F00F:85 AA      155         STA  SPTS
F011:A9 02      156         LDA  #2        ; SET UP TOPCON TO DO THE DISPLAY OF TOP SECTION
F013:85 88      157         STA  TOPCON
F015:A9 00      158         LDA  #0        ; INIT THE HORZ POSITION SHADOW REGISTER FOR P1, P2, AND SHOTS
F017:85 89      159         STA  P1HS
F019:85 8A      160         STA  P2HS
F01B:85 8B      161         STA  S1HS
F01D:85 8C      162         STA  S2HS
F01F:           163 *
F01F:A9 14      164         LDA  #20       ; SET UP PLAYER1  VERTICAL
F021:85 AF      165         STA  P1VERT
F023:A9 1E      166         LDA  #30       ; SET UP PLAYER2 VERTICAL
F025:85 B0      167         STA  P2VERT
F027:A9 0E      168         LDA  #14       ; SET UP PLAYER1 SHOT VERTICAL
F029:85 B1      169         STA  S1VERT
F02B:A9 12      170         LDA  #18       ; SET UP PLAYER2 SHOT VERTICAL
F02D:85 B2      171         STA  S2VERT
F02F:A9 2D      172         LDA  #45       ; SET UP OBJECT A VERITCAL
F031:85 C3      173         STA  OBJAVT
F033:A9 37      174         LDA  #55       ; SET UP OBJECT B VERTICAL
F035:85 CC      175         STA  OBJBVT
F037:A9 41      176         LDA  #65       ; SET UP OBJECT C VERTICAL
F039:85 D5      177         STA  OBJCVT
F03B:           178 *
F03B:A9 FE      179         LDA  #$FE      ; MAKE PLAYER IMAGES
F03D:85 B3      180         STA  P1IMG
F03F:85 BB      181         STA  P2IMG
F041:A9 7F      182         LDA  #$7F
F043:85 B4      183         STA  P1IMG+1
F045:85 BC      184         STA  P2IMG+1
F047:A9 63      185         LDA  #$63
F049:85 B5      186         STA  P1IMG+2
F04B:85 BD      187         STA  P2IMG+2
F04D:A9 62      188         LDA  #$62
F04F:85 B6      189         STA  P1IMG+3
F051:85 BE      190         STA  P2IMG+3
F053:A9 7C      191         LDA  #$7C
F055:85 B7      192         STA  P1IMG+4
F057:85 BF      193         STA  P2IMG+4
F059:A9 78      194         LDA  #$78
F05B:85 B8      195         STA  P1IMG+5
F05D:85 C0      196         STA  P2IMG+5
F05F:A9 60      197         LDA  #$60
F061:85 B9      198         STA  P1IMG+6
F063:85 C1      199         STA  P2IMG+6
F065:A9 F2      200         LDA  #$F2
F067:85 BA      201         STA  P1IMG+7
F069:A9 F6      202         LDA  #$F6
F06B:85 C2      203         STA  P2IMG+7
F06D:           204 *
F06D:           205 *
F06D:4C A0 F0   206         JMP  TINIT     ; JUMP AROUND THIS DATA
F070:           207 *
F070:FE 62 F8   208 LETF    DFB  $FE,$62,$F8,$60,$60,$F0
F073:60 60 F0
F076:3F 66 66   209 LETR    DFB  $3F,$66,$66,$3E,$26,$4F
F079:3E 26 4F
F07C:7E FF C3   210 LETO    DFB  $7E,$FF,$C3,$C3,$FF,$7E
F07F:C3 FF 7E
F082:3F 26 7E   211 LETB    DFB  $3F,$26,$7E,$7E,$26,$3F
F085:7E 26 3F
F088:           212 *
F088:18 24 42   213 LETA    DFB  $18,$24,$42,$42,$7E,$42,$42,$CE
F08B:42 7E 42
F08E:42 CE
F090:FE 61 61   214 LETB8   DFB  $FE,$61,$61,$7E,$7E,$61,$61,$FE
F093:7E 7E 61
F096:61 FE
F098:7E FF FE   215 LETC    DFB  $7E,$FF,$FE,$F0,$F0,$FE,$FF,$7E
F09B:F0 F0 FE
F09E:FF 7E
F0A0:           216 *
F0A0:           217 *   LOOP TO LOAD IMAGES AT TOP OF SCREEN
F0A0:A2 00      218 TINIT   LDX  #0
F0A2:BD 70 F0   219 TLP     LDA  LETF,X
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F0A5:95 8D     220         STA  TREG1,X
F0A7:E8        221         INX
F0A8:E0 18     222         CPX  #$18
F0AA:D0 F6     223         BNE  TLP
F0AC:          224 *
F0AC:A2 00     225         LDX  #0        ; INITIALIZE OBJECT A IMAGE
F0AE:BD 88 F0  226 AIMLP   LDA  LETA,X
F0B1:95 C4     227         STA  OBJAIM,X
F0B3:E8        228         INX
F0B4:E0 08     229         CPX  #8
F0B6:D0 F6     230         BNE  AIMLP
F0B8:          231 *
F0B8:A2 00     232         LDX  #0        ; INITIALIZE OBJECT B IMAGE
F0BA:BD 90 F0  233 BIMLP   LDA  LETB8,X
F0BD:95 CD     234         STA  OBJBIM,X
F0BF:E8        235         INX
F0C0:E0 08     236         CPX  #8
F0C2:D0 F6     237         BNE  BIMLP
F0C4:          238 *
F0C4:A2 00     239         LDX  #0        ; INITIALIXE OBJECT C IMAGE
F0C6:BD 98 F0  240 CIMLP   LDA  LETC,X
F0C9:95 D6     241         STA  OBJCIM,X
F0CB:E8        242         INX
F0CC:E0 08     243         CPX  #8
F0CE:D0 F6     244         BNE  CIMLP
F0D0:          245 *
F0D0:A9 82     246         LDA  #$82      ; SET UP PLAYER1 COLOR
F0D2:85 AB     247         STA  P1CR
F0D4:A9 DA     248         LDA  #$DA      ; SET UP PLAYER2 COLOR
F0D6:85 AC     249         STA  P2CR
F0D8:A9 EA     250         LDA  #$EA      ; SET UP BACKGROUND COLOR
F0DA:85 AD     251         STA  BKCR
F0DC:A9 64     252         LDA  #$64      ; SET UP COLOR FOR OBJECTS
F0DE:85 AE     253         STA  OBJCR
F0E0:A9 05     254         LDA  #5        ; SET UP THE SCREEN MODE PARAMETER
F0E2:85 A5     255         STA  SMODE
F0E4:A9 02     256         LDA  #2        ; SET UP DIGCON
F0E6:85 87     257         STA  DIGCON
F0E8:A9 2B     258         LDA  #$2B      ; NUMBER OF TIMER CLICKS BETWEEN SCREENS
F0EA:85 A9     259         STA  TMCNT     ; ($2B GIVES TIME FOR 36 LINES)
F0EC:          260 *
F0EC:          261 *     MAIN PROGRAM LOOP
F0EC:          262 *
F0EC:          263 *
F0EC:          264 *
F0EC:20 4B F2  265 MAIN    JSR  SYNCH     ; DO THE VERTICAL SYNCH
F0EF:20 75 F2  266         JSR  FMON      ; GO SEE IF USER HAS SOMETHING TO DO
F0F2:20 FB F0  267         JSR  SSETUP    ; SET UP THE ONCE/SCREEN REGISTERS
F0F5:20 14 F1  268         JSR  DISPLAY   ; DO THE LINE BY LINE DISPLAY
F0F8:4C EC F0  269         JMP  MAIN      ; LOOP ALWAYS
F0FB:          270 *
F0FB:          271 *
F0FB:          272 SSETUP  EQU  *
F0FB:A5 89     273         LDA  P1HS      ; PUT HORIZONTAL SHADOW REGISTERS INTO
F0FD:85 20     274         STA  P1HORZ    ; THE VIDEO REGISTERS
F0FF:A5 8A     275         LDA  P2HS
F101:85 21     276         STA  P2HORZ
F103:A5 8B     277         LDA  S1HS
F105:85 22     278         STA  S1HORZ
F107:A5 8C     279         LDA  S2HS
F109:85 23     280         STA  S2HORZ
F10B:          281 *
F10B:A5 AD     282         LDA  BKCR      ; GET THE BACKGROUND COLOR
F10D:85 09     283         STA  BCOLOR
F10F:A5 AE     284         LDA  OBJCR     ; UPDATE THE OBJECT COLOR
F111:85 08     285         STA  OCOLOR
F113:          286 *
F113:          287 *       DONE WITH THE ONCE PER SCREEN STUFF
F113:60        288         RTS
F114:          289 *
F114:          290 *
F114:          291 *       DISPLAY
F114:          292 *
F114:          293 * THE DISPLAY ROUTINE IS CALLED ONCE PER SCREEN TO DO A LINE BY LINE UPDATE
F114:          294 * OF THE VIDEO REGISTERS.
F114:          295 *
F114:          296 *
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F114:          297 * NOTE: THIS LOOP LETS TWO HORIZONTAL SYNCH PULSES GO BEFORE
F114:          298 * INCREMENT OF VERTICAL LINE COUNT.
F114:          299 * THIS CAUSES ALL SCREEEN PATTERNS TO BE TWO LINES HIGH FOR EACH LOOP
F114:          300 * THROUGH DISPLAY.
F114:          301 *
F114:          302 *
F114:          303 *
F114:A9 00     304 DISPLAY LDA  #0        ; RESET THE LINE COUNTER
F116:85 85     305         STA  VLNCT
F118:          306 * HERE IS A TEST TO SEE IF WE GO TO THE SINGLE LINE RESOLUTION DISPLAY
F118:A5 AA     307         LDA  SPTS      ; GET THE CONTROL BITS
F11A:29 40     308         AND  #$40      ; SEE IF WE GO TO THE OTHER DISPLAY SECTION
F11C:F0 03     309         BEQ  DOUBLE    ; IF NOT CONTINUE WITH DOUBLE LINE ROUTINE
F11E:4C 0B F3  310         JMP  SINGLE
F121:85 02     311 DOUBLE  STA  LWAIT     ; WAIT FOR END OF LINE
F123:85 2A     312         STA  HZSCRL    ; DONE AT END OF LINE THIS CAUSES THE
F125:          313 *                    HORIZONTAL REGISTERS TO BE UPDATED FOR MOTION
F125:          314 *
F125:AD 84 02  315 TWAIT   LDA  RTIME     ; WAIT FOR THE TIMER TO GET TO ZERO
F128:D0 FB     316         BNE  TWAIT
F12A:          317 *
F12A:85 02     318         STA  LWAIT
F12C:85 01     319         STA  VRESET    ; TURN SCREEN ON
F12E:          320 *
F12E:BA        321         TSX             ; SAVE STACK POINTER SO WE CAN USE A PHP INSTRUCTION TO GET THE
F12F:          322 *                FLAG REGISTER BELOW
F12F:86 86     323         STX  SPREG
F131:A5 87     324         LDA  DIGCON    ; GET THE DIGIT CONTROL BYTE
F133:85 0A     325         STA  FVMODE    ; SEND IT TO THE VIDEO
F135:A6 88     326         LDX  TOPCON    ; GET THE CONTROL BYTE FOR THE TOP OF SCREEN
F137:85 02     327 TOPWT   STA  LWAIT     ; WAIT THAT MANY LINES
F139:CA        328         DEX
F13A:D0 FB     329         BNE  TOPWT
F13C:          330 *
F13C:          331 * DISPLAY TOP PART OF SCREEN
F13C:          332 *
F13C:A2 00     333         LDX  #0        ; DO A SIX LINE LOOP
F13E:          334 *
F13E:85 02     335 TOPLP   STA  LWAIT     ; WAIT FOR EOL
F140:B5 8D     336         LDA  TREG1,X   ; FIRST IMAGE BLOCK
F142:85 0E     337         STA  FLDBIM    ; PUT ON SCREEN
F144:B5 93     338         LDA  TREG2,X   ; NEXT FIELD
F146:85 0F     339         STA  FLDCIM
F148:EA        340         NOP               ; WAIT A WHILE
F149:EA        341         NOP
F14A:EA        342         NOP
F14B:EA        343         NOP
F14C:EA        344         NOP
F14D:EA        345         NOP
F14E:EA        346         NOP
F14F:EA        347         NOP
F150:EA        348         NOP
F151:B5 99     349         LDA  TREG3,X
F153:85 0E     350         STA  FLDBIM    ; PUT UP NEXT FIELD
F155:B5 9F     351         LDA  TREG4,X
F157:85 0F     352         STA  FLDCIM    ; PUT IN 4TH FIELD
F159:          353 *
F159:85 02     354         STA  LWAIT     ; WAIT FOR THE NEXT LINE
F15B:B5 8D     355         LDA  TREG1,X   ; GET NEXT IMAGE
F15D:85 0E     356         STA  FLDBIM    ; PUT IT UP
F15F:B5 93     357         LDA  TREG2,X   ; NOW SECOND FIELD AGAIN
F161:85 0F     358         STA  FLDCIM
F163:EA        359         NOP                ; WAIT THE SAME WHILE
F164:EA        360         NOP
F165:EA        361         NOP
F166:EA        362         NOP
F167:EA        363         NOP
F168:EA        364         NOP
F169:EA        365         NOP
F16A:EA        366         NOP
F16B:EA        367         NOP
F16C:B5 99     368         LDA  TREG3,X
F16E:85 0E     369         STA  FLDBIM    ; PART 3
F170:B5 9F     370         LDA  TREG4,X   ; GET PART 4
F172:85 0F     371         STA  FLDCIM    ; PUT UP LAST PART
F174:          372 *
F174:E8        373         INX               ; MOVE TO NEXT GROUP
```

```
F175:E0 06     374         CPX  #6
F177:D0 C5     375         BNE  TOPLP
F179:          376 *
F179:A9 00     377 PART2   LDA  #0        ; CLEAR OUT VID REGISTER
F17B:85 02     378         STA  LWAIT     ; WAIT FOR LINE TO END
F17D:85 0E     379         STA  FLDBIM
F17F:85 0F     380         STA  FLDCIM
F181:          381 *
F181:A5 A5     382         LDA  SMODE     ; GET THE SCREEN MODE PARAMETER
F183:85 0A     383         STA  FVMODE    ; WHAT?
F185:A5 AB     384         LDA  P1CR      ; GET THE COLOR FOR PLAYER 1
F187:85 06     385         STA  P1COLOR
F189:A5 AC     386         LDA  P2CR      ; GET THE COLOR FOR PLAYER 2
F18B:85 07     387         STA  P2COLOR
F18D:A5 AA     388         LDA  SPTS      ; GET ENABLE BITS
F18F:85 A8     389         STA  EBITS     ; FEED AS PARAMETERS TO NEXT SECTION\004\004
F191:10 08     390         BPL  SLOOP     ; SHOW EACH SCREEN
F193:A5 80     391         LDA  SCREENS   ; ELSE ONLY ENABLE EVERY OTHER SCREEN
F195:29 01     392         AND  #1
F197:D0 02     393         BNE  SLOOP
F199:85 A8     394         STA  EBITS     ; CLEAR ENABLE BITS
F19B:          395 *
F19B:          396 *
F19B:A2 1E     397 SLOOP   LDX  #P2SHOT   ; USE THE STACK MECH TO SEND OUT SHOTS
F19D:9A        398         TXS
F19E:          399 *
F19E:85 02     400         STA  LWAIT     ; THIS IS A LINE BY LINE LOOP
F1A0:          401 *
F1A0:A5 B2     402         LDA  S2VERT    ; SEE IF TIME TO DISPLAY SHOT
F1A2:45 85     403         EOR  VLNCT
F1A4:08        404         PHP             ; THIS WILL DISPLAY IF Z FLAG SET
F1A5:A5 B1     405         LDA  S1VERT
F1A7:45 85     406         EOR  VLNCT
F1A9:08        407         PHP
F1AA:          408 *
F1AA:A5 A8     409         LDA  EBITS     ; SEE IF WE SHOULD DO THIS SECTION
F1AC:29 01     410         AND  #1
F1AE:F0 14     411         BEQ  P2TST     ; NOT IF THE BIT IS ZERO
F1B0:38        412         SEC                ; TEST FOR VERT CLOSE TO PLAYER 1
F1B1:A5 85     413         LDA  VLNCT     ; GET THE VERTICAL POSITION AT THIS LINE
F1B3:E5 AF     414         SBC  P1VERT    ; SUBTRACT THE PLAYER1 VERTICAL POSITION
F1B5:90 04     415         BCC  NOP1      ; IF CARRY CLEAR THEN WE ARE NOT THERE YET
F1B7:C9 08     416         CMP  #8        ; A NOW HOLDS THE INDEX TO THE IMAGE ARRAY
F1B9:90 04     417         BCC  INP1      ; IF CARRY CLEAR WE ARE IN RANGE TO SHOW A LINE OF P1 IMAGE
F1BB:A9 00     418 NOP1    LDA  #0        ; IF HERE, NO SHOW
F1BD:F0 03     419         BEQ  P1DSP
F1BF:AA        420 INP1    TAX            ; GO GET LINE OF IMAGE
F1C0:B5 B3     421         LDA  P1IMG,X
F1C2:85 1B     422 P1DSP   STA  P1IMAG    ; DISPLAY PLAYER1 IMAGE
F1C4:          423 *
F1C4:A5 A8     424 P2TST   LDA  EBITS     ; SEE IF WE SHOULD DO SECTION 2
F1C6:29 02     425         AND  #2
F1C8:F0 14     426         BEQ  OATST
F1CA:38        427         SEC              ; GET READY FOR SUBTRACT
F1CB:A5 85     428         LDA  VLNCT     ; GET THE VERTICAL POSITION AT THIS LINE
F1CD:E5 B0     429         SBC  P2VERT    ; SUBTRACT THE PLAYER2 VERTICAL POSITION
F1CF:90 04     430         BCC  NOP2      ; IF CARRY CLEAR THEN WE ARE NOT THERE YET
F1D1:C9 08     431         CMP  #8        ; A NOW HOLDS THE INDEX TO THE IMAGE ARRAY
F1D3:90 04     432         BCC  IMP2      ; IF CARRY CLEAR WE ARE IN RANGE TO SHOW A LINE OF P2 IMAGE
F1D5:A9 00     433 NOP2    LDA  #0        ; IF HERE, NO P2 SHOW
F1D7:F0 03     434         BEQ  P2DSP
F1D9:AA        435 IMP2    TAX               ; GO GET LINE OF IMAGE
F1DA:B5 BB     436         LDA  P2IMG,X
F1DC:85 1C     437 P2DSP   STA  P2IMAG    ; DISPLAY PLAYER2 IMAGE
F1DE:          438 *
F1DE:A5 A8     439 OATST   LDA  EBITS     ; SEE IF WE DO SECTION 3
F1E0:29 04     440         AND  #4
F1E2:F0 14     441         BEQ  OBTST
F1E4:38        442         SEC              ; TEST FOR VERT CLOSE TO OBJECT A
F1E5:A5 85     443         LDA  VLNCT
F1E7:E5 C3     444         SBC  OBJAVT    ; SUBTRACT THE OBJECT A VERTICAL POSITION
F1E9:90 04     445         BCC  NOA         ; IF CLEAR THEN NOT THERE
F1EB:C9 08     446         CMP  #8        ; IF INDEX PAST 8 THEN
F1ED:90 04     447         BCC  INOA      ; KEEP GOING, ELSE DISPLAY
F1EF:A9 00     448 NOA     LDA  #0        ; NOT AT OBJECT A
F1F1:F0 03     449         BEQ  OADSP     ; GO FILL WITH 0
F1F3:AA        450 INOA    TAX             ; GO GET LINE OF IMAGE
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F1F4:B5 C4     451          LDA  OBJAIM,X
F1F6:85 0D     452 OADSP    STA  FLDAIM    ; SEND TO OBJECT A
F1F8:          453 *
F1F8:A5 A8     454 OBTST    LDA  EBITS     ; SEE IF WE DO 4
F1FA:29 08     455          AND  #8
F1FC:F0 14     456          BEQ  OCTST
F1FE:38        457          SEC               ; TEST FOR VERT CLOSE TO OBJECT B
F1FF:A5 85     458          LDA  VLNCT
F201:E5 CC     459          SBC  OBJBVT    ; SUB OBJ B VERTICAL
F203:90 04     460          BCC  NOB        ; IF CLEAR, NOT THERE YET
F205:C9 08     461          CMP  #8         ; IF > 7, GONE TOO FAR
F207:90 04     462          BCC  INOB
F209:A9 00     463 NOB      LDA  #0        ; NOT AT OBJECT B
F20B:F0 03     464          BEQ  OBDSP     ; GO FILL WITH 0
F20D:AA        465 INOB     TAX             ; GO GET LINE OF IMAGE
F20E:B5 CD     466          LDA  OBJBIM,X
F210:85 0E     467 OBDSP    STA  FLDBIM    ; SEND TO OBJECT B
F212:          468 *
F212:A5 A8     469 OCTST    LDA  EBITS     ; SEE IF WE DO 5
F214:29 10     470          AND  #16
F216:F0 14     471          BEQ  ENDLP
F218:38        472          SEC               ; TEST FOR VERT CLOSE TO OBJECT C
F219:A5 85     473          LDA  VLNCT
F21B:E5 D5     474          SBC  OBJCVT    ; SUB OBJ C VERTICAL
F21D:90 04     475          BCC  NOC       ; IF CLEAR, NOT THERE YET
F21F:C9 08     476          CMP  #8        ; IF > 7, GONE TOO FAR
F221:90 04     477          BCC  INOC
F223:A9 00     478 NOC      LDA  #0        ; NOT AT OBJECT C
F225:F0 03     479          BEQ  OCDSP     ; GO FILL WITH 0
F227:AA        480 INOC     TAX             ; GO GET LINE OF IMAGE
F228:B5 D6     481          LDA  OBJCIM,X
F22A:85 0F     482 OCDSP    STA  FLDCIM    ; SEND TO OBJECT C
F22C:          483 *
F22C:E6 85     484 ENDLP    INC  VLNCT     ; MOVE TO NEXT LINE
F22E:A5 85     485          LDA  VLNCT     ; CHECK TO SEE IF DONE
F230:C9 66     486          CMP  #$66
F232:F0 03     487          BEQ  LPDONE    ; WITH THE MAIN SCREEN LOOP
F234:4C 9B F1  488          JMP  SLOOP     ; IF NOT GO BACK FOR ANOTHER LINE
F237:          489 *
F237:          490 *
F237:A6 86     491 LPDONE   LDX  SPREG     ; DONE WITH SCREEN SO PUT THE STACK POINTER BACK
F239:9A        492          TXS
F23A:          493 *    NOW SOME END OF PAGE REGISTER STUFFING
F23A:A9 00     494          LDA  #0
F23C:85 1D     495          STA  P1SHOT
F23E:85 1E     496          STA  P2SHOT
F240:85 1B     497          STA  P1IMAG
F242:85 1C     498          STA  P2IMAG
F244:85 0D     499          STA  FLDAIM
F246:85 0E     500          STA  FLDBIM
F248:85 0F     501          STA  FLDCIM
F24A:          502 *            DONE WITH DISPLAY
F24A:60        503          RTS
F24B:          504 *
F24B:          505 *
F24B:          506 *
F24B:          507 *
F24B:          508 *
F24B:          509 *
F24B:          510 *
F24B:E6 80     511 SYNCH    INC  SCREENS   ; UPDATE SCREEN COUNT
F24D:A9 3C     512          LDA  #60       ; TEST FOR OVERFLOW INTO SECONDS
F24F:45 80     513          EOR  SCREENS
F251:D0 04     514          BNE  SYN1      ; BRANCH IF NO OVERFLOW
F253:85 80     515          STA  SCREENS   ; ELSE ZERO SCREENS AND
F255:E6 81     516          INC  SECONDS   ; UPDATE THE SECONDS COUNT
F257:          517 *
F257:A9 02     518 SYN1     LDA  #2        ; GET READY FOR VERTICAL SYNCH PULSE GENERATION
F259:85 02     519          STA  LWAIT     ; WAIT FOR END OF LINE
F25B:85 01     520          STA  VRESET    ; RESET VIDEO
F25D:85 02     521          STA  LWAIT     ; WAIT THREE LINES
F25F:85 02     522          STA  LWAIT
F261:85 02     523          STA  LWAIT
F263:85 00     524          STA  VSYNCH    ; START SYNCH PULSE
F265:A9 00     525          LDA  #0        ; WRITE 0 TO END PULSE
F267:85 02     526          STA  LWAIT     ; BUT FIRST WAIT THREE LINES
F269:85 02     527          STA  LWAIT
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F26B:85 02     528         STA  LWAIT
F26D:85 00     529         STA  VSYNCH    ; END PULSE
F26F:A5 A9     530         LDA  TMCNT     ; HAVE TIMER COUNT THIS DOWN
F271:8D 96 02  531         STA  TIM64     ; IN DIVIDE BY 64 MODE TO GIVE US
F274:          532 *   TIME TO DO SOME STUFF BEFORE WE NEED TO DISPLAY SCREEN.
F274:          533 *   WHEN THAT TIME COMES WE WILL BE DISPLAYING LINE BY LINE
F274:          534 *   AND TIME WILL BE VERY SHORT.
F274:          535 *
F274:60        536         RTS            ; DONE WITH VERTICAL SYNCH
F275:          537 *
F275:          538 *
F275:          539 *
F275:          540 *
F275:          541 * FMON
F275:          542 *  COMMANDS
F275:          543 *
F275:          544 *    10 - SET ADDRESS (2 BYTE)
F275:          545 *    20 - READ BYTE
F275:          546 *    40 - WRITE BYTE
F275:          547 *
F275:          548 *  SUB COMMANDS
F275:          549 *
F275:          550 *    X0 - DO NOTHING
F275:          551 *    X1 - POST INCREMENT
F275:          552 *    X2 - POST DECREMENT
F275:          553 *
F275:          554 *  MEMORY USAGE
F275:          555 *
F275:          556 *   TARL - TARGET ADDRESS LOW
F275:          557 *   TARH - TARGET ADDRESS HIGH
F275:          558 *   COMCOD - COMMAND CODE STORE
F275:          559 * DECLARATIONS
FFF0:          560 AR1     EQU  $FFF0     ; FMON WRITE REG
FFF1:          561 AR2     EQU  $FFF1     ; FMON STATUS
FFF2:          562 AR3     EQU  $FFF2     ; FMON READ REG
F275:          563 *
F275:          564 *
F275:AD F1 FF  565 FMON    LDA  AR2       ; LOOK TO SEE IF COMMAND WAITING
F278:29 40     566         AND  #$40
F27A:F0 0F     567         BEQ  NOCOM     ; IF NOT JUST EXIT
F27C:AD F2 FF  568         LDA  AR3       ; GET THE COMMAND
F27F:85 84     569         STA  COMCOD
F281:29 10     570         AND  #$10
F283:F0 07     571         BEQ  L1
F285:20 B6 F2  572         JSR  SETADDR
F288:4C 75 F2  573         JMP  FMON
F28B:60        574 NOCOM   RTS              ; IF NO COMMAND JUST RETURN
F28C:A5 84     575 L1      LDA  COMCOD
F28E:29 20     576         AND  #$20
F290:F0 06     577         BEQ  L2
F292:20 C7 F2  578         JSR  READ
F295:4C 75 F2  579         JMP  FMON
F298:A5 84     580 L2      LDA  COMCOD
F29A:29 40     581         AND  #$40
F29C:F0 03     582         BEQ  L3
F29E:20 E9 F2  583         JSR  WRITE
F2A1:4C 75 F2  584 L3      JMP  FMON
F2A4:          585 *
F2A4:          586 *  READOK
F2A4:          587 *
F2A4:          588 * CHECK IF IT IS OK TO READ APPLE
F2A4:          589 *
F2A4:AD F1 FF  590 READOK  LDA  AR2       ; GET STATUS BYTE
F2A7:29 40     591         AND  #$40      ; OK TO READ?
F2A9:F0 F9     592         BEQ  READOK    ; NO KEEP LOOKING
F2AB:60        593         RTS             ; YES
F2AC:68        594         PLA
F2AD:60        595 DOREAD  RTS
F2AE:          596 *
F2AE:          597 *
F2AE:AD F1 FF  598 WRITEOK LDA  AR2
F2B1:29 80     599         AND  #$80
F2B3:F0 F9     600         BEQ  WRITEOK
F2B5:60        601         RTS
F2B6:          602 *
F2B6:          603 * SETADDR
F2B6:          604 *
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F2B6:           605 *
F2B6:20 A4 F2   606 SETADDR JSR  READOK
F2B9:AD F2 FF   607         LDA  AR3
F2BC:85 83      608         STA  TARH
F2BE:20 A4 F2   609         JSR  READOK
F2C1:AD F2 FF   610         LDA  AR3
F2C4:85 82      611         STA  TARL
F2C6:60         612         RTS
F2C7:           613 *
F2C7:           614 * READ
F2C7:           615 *
F2C7:           616 *
F2C7:20 AE F2   617 READ    JSR  WRITEOK
F2CA:A0 00      618         LDY  #0
F2CC:B1 82      619         LDA  (TARL),Y
F2CE:8D F0 FF   620         STA  AR1
F2D1:A5 84      621         LDA  COMCOD
F2D3:29 07      622         AND  #$07
F2D5:F0 09      623         BEQ  RL1
F2D7:29 01      624         AND  #$01
F2D9:F0 08      625         BEQ  RL2
F2DB:C6 82      626         DEC  TARL
F2DD:4C E8 F2   627         JMP  RXT
F2E0:4C E8 F2   628 RL1     JMP  RXT
F2E3:E6 82      629 RL2     INC  TARL
F2E5:4C E8 F2   630         JMP  RXT
F2E8:60         631 RXT     RTS
F2E9:           632 *
F2E9:           633 * WRITE
F2E9:           634 *
F2E9:20 A4 F2   635 WRITE   JSR  READOK
F2EC:AD F2 FF   636         LDA  AR3
F2EF:A0 00      637         LDY  #0
F2F1:91 82      638         STA  (TARL),Y
F2F3:A5 84      639         LDA  COMCOD
F2F5:29 07      640         AND  #$07
F2F7:F0 09      641         BEQ  WL1
F2F9:29 01      642         AND  #$01
F2FB:F0 08      643         BEQ  WL2
F2FD:C6 82      644         DEC  TARL
F2FF:4C 0A F3   645         JMP  WXT
F302:4C 0A F3   646 WL1     JMP  WXT
F305:E6 82      647 WL2     INC  TARL
F307:4C 0A F3   648         JMP  WXT
F30A:60         649 WXT     RTS
F30B:           650 *
F30B:           651 *
F30B:           652 *
F30B:           653 * HERE IS SINGLE HORIZONTAL LINE RESOLUTION DISPLAY ROUTINE.
F30B:           654 * THIS STUFF WAS ADDED IN 1/83 TO DEMONSTRATE HORIZONTAL POSITIONING
F30B:           655 *   WE WILL BE DOING A SEQUENCE OF GRAPHIC EXPERIMENTS AS WE GO DOWN THE
F30B:           656 * THE SCREEN.
F30B:           657 *
F30B:           658 *
F30B:           659 *
F30B:           660 * FIRST SOME INITIALIZATION
F30B:           661 SINGLE  EQU  *         ; HERE WHEN STARTING SINGLE LINE MODE
F30B:A2 07      662         LDX  #7        ; COPY FROBCO LETTERS INTO IMAGE BUFFERS
F30D:BD 1E F5   663 CPLP    LDA  FROB1,X   ; GET THE F
F310:95 B3      664         STA  P1IMG,X   ; PUT IN BUFFER
F312:BD 26 F5   665         LDA  FROB2,X   ; GET THE R
F315:95 BB      666         STA  P2IMG,X   ; PUT IN BUFFER
F317:BD 2E F5   667         LDA  FROB3,X   ; GET THE O
F31A:95 C4      668         STA  OBJAIM,X  ; BORROW THIS BUFFER
F31C:BD 36 F5   669         LDA  FROB4,X   ; AND THE OTHER OBJ BUFFERS
F31F:95 CD      670         STA  OBJBIM,X  ; FROM THE OTHER SCREEN
F321:BD 3E F5   671         LDA  FROB5,X   ; THE C
F324:95 D6      672         STA  OBJCIM,X
F326:BD 46 F5   673         LDA  FROB6,X   ; THE ROUND O
F329:95 DE      674         STA  OBJXIM,X  ; WE ADDED THIS BUFFER
F32B:CA         675         DEX
F32C:10 DF      676         BPL  CPLP      ; DO THE ABOVE FOR 8 LINES OF DATA
F32E:A9 05      677         LDA  #5        ; SET UP TAB STOP FOR 6 IMAGE EXPERIMENT
F330:85 E6      678         STA  TP1
F332:A9 30      679         LDA  #$30      ; SET TP25 TO NOTHING
F334:85 E7      680         STA  TP25
F336:           681 *
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F336:           682 *
F336:           683 * END OF SINGLE LINE MODE INIT
F336:           684 *
F336:           685 * NOW THE ONCE PER SCREEN STUFF
F336:           686 DISPLAY2 EQU *
F336:20 75 F2   687         JSR  FMON      ; LET THE USER ADJUST PARAMETERS
F339:A5 AA      688         LDA  SPTS      ; GET THE ENABLE BITS
F33B:29 40      689         AND  #$40      ; SEE IF WE ARE STILL IN SINGLE LINE MODE
F33D:D0 03      690         BNE  HANGIN    ; IF SO HANG IN THERE
F33F:4C 00 F0   691         JMP  START     ; ELSE START OVER
F342:           692 HANGIN  EQU  *
F342:           693 *
F342:A5 A5      694         LDA  SMODE     ; SHADOW OF THE FIELD MODE REGISTER
F344:85 0A      695         STA  FVMODE
F346:A5 AB      696         LDA  P1CR      ; GET THE COLOR FOR PLAYER 1
F348:85 06      697         STA  P1COLOR
F34A:A5 AC      698         LDA  P2CR      ; GET THE COLOR FOR PLAYER 2
F34C:85 07      699         STA  P2COLOR
F34E:A5 AD      700         LDA  BKCR      ; GET THE BACKGROUND COLOR
F350:85 09      701         STA  BCOLOR
F352:A5 AE      702         LDA  OBJCR     ; UPDATE THE OBJECT COLOR
F354:85 08      703         STA  OCOLOR
F356:           704 *
F356:AD 84 02   705 STWAIT  LDA  RTIME     ; WAIT FOR TIMER TO GET TO 0
F359:D0 FB      706         BNE  STWAIT
F35B:           707 *
F35B:85 02      708         STA  LWAIT
F35D:85 01      709         STA  VRESET    ; TURN SCREEN ON
F35F:           710 *
F35F:           711 *
F35F:A2 17      712         LDX  #23       ; GO DOWN TO LINE 60
F361:85 02      713 LN60    STA  LWAIT
F363:CA         714         DEX
F364:D0 FB      715         BNE  LN60
F366:           716 *
F366:           717 *
F366:           718 *      EXEPERIMENT NUMBER 1, PLAYER HORIZONTAL POSITIONING
F366:           719 *
F366:           720 * IN THIS EXPERIMENT WE TAKE THE VALUE THE USER HAS SET FOR HORIZONTAL
F366:           721 * AND USE A POSITIONING ALGORITHM COMPOSED OF A COURSE PART AND
F366:           722 * A FINE RESOLUTION PART.  IT IS NOT TOTALY LINIER, BUT IT SHOWS THE WAY.
F366:           723 *
F366:A9 00      724         LDA  #0        ; SET PLAYER FOR SINGLE IMAGE MODE
F368:85 04      725         STA  P1VMOD
F36A:A5 89      726         LDA  P1HS      ; SET H SETTING
F36C:4A         727         LSR  A         ; GET COURSE BITS
F36D:4A         728         LSR  A
F36E:4A         729         LSR  A
F36F:4A         730         LSR  A
F370:18         731         CLC            ; COURSE POSITION STARTS AT 4
F371:69 04      732         ADC  #4        ; SO BACK IT UP
F373:AA         733         TAX            ; SAVE IN X
F374:A5 89      734         LDA  P1HS      ; GET HORIZONTAL SHADOW
F376:0A         735         ASL  A         ; MOVE TO HIGH NIBBLE
F377:0A         736         ASL  A
F378:0A         737         ASL  A
F379:0A         738         ASL  A
F37A:49 70      739         EOR  #$70      ; MAKE NUMBERS GO FROM LEFT TO RIGHT
F37C:85 20      740         STA  P1HORZ    ;  FINE OFFSET
F37E:85 02      741         STA  LWAIT     ; WAIT FOR END OF LINE
F380:CA         742 HFP1    DEX            ; SELECT CORSE POSITION BY THE TIME IN THIS LOOP
F381:10 FD      743         BPL  HFP1
F383:85 10      744         STA  P1HRES    ; THIS IS THE COURSE SETTING PROCESS
F385:           745 *
F385:           746 * NOW CAUSE THE HORZ INC TO BE ADDED TO THE ABSOLUTE POSITION
F385:85 02      747         STA  LWAIT     ; GET TO END OF LINE
F387:85 2A      748         STA  HZSCRL    ; ADD INCREMENT
F389:           749 *
F389:           750 *
F389:A2 00      751         LDX  #0        ; INDEX TO PLAYER IMAGE
F38B:85 02      752 IMLP1   STA  LWAIT     ; WAIT TILL NEXT LINE
F38D:B5 B3      753         LDA  P1IMG,X   ; GET LINE OF PLAYER IMAGE
F38F:85 1B      754         STA  P1IMAG    ; PUT OUT TO REGISTER
F391:E8         755         INX
F392:E0 08      756         CPX  #8        ; SEE IF DONE
F394:90 F5      757         BCC  IMLP1     ; IF NOT GO DO ANOTHER LINE
F396:85 02      758         STA  LWAIT     ; FINISH THE LINE
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F398:A9 00     759         LDA  #0
F39A:85 1B     760         STA  P1IMAG    ; TURN OFF PLAYER
F39C:          761 *
F39C:          762 * WE ARE NOW AT LINE 71
F39C:          763 *
F39C:          764 * NOW DO THE SAME FOR PLAYER2
F39C:          765 *
F39C:A9 00     766         LDA  #0        ; SET PLAYER FOR SINGLE IMAGE MODE
F39E:85 05     767         STA  P2VMOD
F3A0:A5 8A     768         LDA  P2HS      ; SET H SETTING
F3A2:4A        769         LSR  A         ; GET COURSE BITS
F3A3:4A        770         LSR  A
F3A4:4A        771         LSR  A
F3A5:4A        772         LSR  A
F3A6:18        773         CLC            ; COURSE POSITION STARTS AT 4
F3A7:69 04     774         ADC  #4        ; SO BACK IT UP
F3A9:AA        775         TAX            ; SAVE IN X
F3AA:A5 8A     776         LDA  P2HS      ; GET HORIZONTAL SHADOW
F3AC:0A        777         ASL  A         ; MOVE TO HIGH NIBBLE
F3AD:0A        778         ASL  A
F3AE:0A        779         ASL  A
F3AF:0A        780         ASL  A
F3B0:49 70     781         EOR  #$70      ; MAKE NUMBERS GO FROM LEFT TO RIGHT
F3B2:85 21     782         STA  P2HORZ    ;  FINE OFFSET
F3B4:85 02     783         STA  LWAIT     ; WAIT FOR END OF LINE
F3B6:CA        784 HFP2    DEX            ; SELECT CORSE POSITION BY THE TIME IN THIS LOOP
F3B7:10 FD     785         BPL  HFP2
F3B9:85 11     786         STA  P2HRES    ; THIS IS THE COURSE SETTING PROCESS
F3BB:          787 *
F3BB:          788 * NOW CAUSE THE HORZ INC TO BE ADDED TO THE ABSOLUTE POSITION
F3BB:85 02     789         STA  LWAIT     ; GET TO END OF LINE
F3BD:85 2A     790         STA  HZSCRL    ; ADD INCREMENT
F3BF:          791 *
F3BF:          792 *
F3BF:A2 00     793         LDX  #0        ; INDEX TO PLAYER IMAGE
F3C1:85 02     794 IMLP2   STA  LWAIT     ; WAIT TILL NEXT LINE
F3C3:B5 BB     795         LDA  P2IMG,X   ; GET LINE OF PLAYER IMAGE
F3C5:85 1C     796         STA  P2IMAG    ; PUT OUT TO REGISTER
F3C7:E8        797         INX
F3C8:E0 08     798         CPX  #8        ; SEE IF DONE
F3CA:90 F5     799         BCC  IMLP2     ; IF NOT GO DO ANOTHER LINE
F3CC:85 02     800         STA  LWAIT     ; FINISH THE LINE
F3CE:A9 00     801         LDA  #0
F3D0:85 1C     802         STA  P2IMAG    ; TURN OFF PLAYER
F3D2:          803 *
F3D2:          804 * WE ARE NOW AT LINE 82
F3D2:          805 *
F3D2:          806 *
F3D2:          807 * EXPERIMENT NUMBER 2, DOUBLE IMAGES
F3D2:          808 *
F3D2:          809 *
F3D2:A9 01     810         LDA  #1        ; SET PLAYER FOR DOUBLE IMAGE MODE
F3D4:85 04     811         STA  P1VMOD
F3D6:          812 *
F3D6:A2 00     813         LDX  #0        ; INDEX TO PLAYER IMAGE
F3D8:85 02     814 DMLP1   STA  LWAIT     ; WAIT TILL NEXT LINE
F3DA:A4 E6     815         LDY  TP1       ; WAIT BEFORE LOADING DISPLAY
F3DC:88        816 YWAIT1  DEY            ; THIS WAITS 5*TP1 CYCLES
F3DD:D0 FD     817         BNE  YWAIT1
F3DF:B5 B3     818         LDA  P1IMG,X   ; GET LINE OF PLAYER IMAGE
F3E1:85 1B     819         STA  P1IMAG    ; PUT OUT TO REGISTER
F3E3:B5 C4     820         LDA  OBJAIM,X  ; GET ANOTHER IMAGE
F3E5:85 1B     821         STA  P1IMAG    ; AND SEND IT ALSO
F3E7:E8        822         INX
F3E8:E0 08     823         CPX  #8        ; SEE IF DONE
F3EA:90 EC     824         BCC  DMLP1     ; IF NOT GO DO ANOTHER LINE
F3EC:85 02     825         STA  LWAIT     ; FINISH THE LINE
F3EE:A9 00     826         LDA  #0
F3F0:85 1B     827         STA  P1IMAG    ; TURN OFF PLAYER
F3F2:          828 *
F3F2:          829 * WE ARE NOW AT LINE 92
F3F2:          830 *
F3F2:          831 * NOW DO THE SAME FOR PLAYER2
F3F2:          832 *
F3F2:A9 01     833         LDA  #1        ; SET PLAYER FOR DOUBLE IMAGE MODE
F3F4:85 05     834         STA  P2VMOD
F3F6:          835 *
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F3F6:A2 00     836         LDX  #0        ; INDEX TO PLAYER IMAGE
F3F8:85 02     837 DMLP2   STA  LWAIT     ; WAIT TILL NEXT LINE
F3FA:A4 E6     838         LDY  TP1       ; WAIT BEFORE LOADING DISPLAY
F3FC:88        839 YWAIT2  DEY            ; THIS WAITS 5*TP1 CYCLES
F3FD:D0 FD     840         BNE  YWAIT2
F3FF:B5 BB     841         LDA  P2IMG,X   ; GET LINE OF PLAYER IMAGE
F401:85 1C     842         STA  P2IMAG    ; PUT OUT TO REGISTER
F403:B5 CD     843         LDA  OBJBIM,X  ; GET ANOTHER IMAGE
F405:85 1C     844         STA  P2IMAG    ; PUT IT UP
F407:E8        845         INX
F408:E0 08     846         CPX  #8        ; SEE IF DONE
F40A:90 EC     847         BCC  DMLP2     ; IF NOT GO DO ANOTHER LINE
F40C:85 02     848         STA  LWAIT     ; FINISH THE LINE
F40E:A9 00     849         LDA  #0
F410:85 1C     850         STA  P2IMAG    ; TURN OFF PLAYER
F412:          851 *
F412:          852 * WE ARE NOW AT LINE 102
F412:          853 *
F412:          854 * EXPERIMENT NUMBER 3, ABSOLUTE CYCLE POSITIONING
F412:          855 *
F412:          856 * TO SHOW THE RELATION OF TIME TO SCREEN POSITION, WE WILL TURN THE VIDEO
F412:          857 * ON AND OFF AT SET TIMES
F412:          858 *
F412:          859 *
F412:A9 00     860         LDA  #0        ; CODE TO TURN VIDEO ON
F414:A2 02     861         LDX  #2        ; CODE TO TURN VIDEO OFF
F416:A0 05     862         LDY  #5        ; HOW MANY TIMES TO DO IT
F418:          863 *
F418:85 02     864         STA  LWAIT     ; START LINE
F41A:EA        865         NOP            ; WAIT 20 CYCLES
F41B:EA        866         NOP
F41C:EA        867         NOP
F41D:EA        868         NOP
F41E:EA        869         NOP
F41F:          870 *
F41F:EA        871         NOP
F420:EA        872         NOP
F421:EA        873         NOP
F422:EA        874         NOP
F423:EA        875         NOP
F424:86 01     876 VLP     STX  VRESET    ; TURN OFF VIDEO
F426:85 01     877         STA  VRESET    ; TURN ON 3 CYCLES LATER
F428:88        878         DEY            ; LOOP COUNT
F429:D0 F9     879         BNE  VLP       ; LOOP TILL EXPERIMENT COMPLETE
F42B:85 02     880         STA  LWAIT     ; MOVE TO LINE 105
F42D:          881 *
F42D:          882 *
F42D:          883 *
F42D:          884 * EXPERIMENT 4, 6 DIGIT DISPLAY
F42D:          885 * NOW WE WILL USE BOTH THE AREAS OF MEMORY OF THE PLAYER IMAGES
F42D:          886 * AND THE OBJECT IMAGES TO PUT UP A HIGH RESOLUTION 6 DIGIT DISPLAY.
F42D:          887 *
F42D:          888 *
F42D:A2 0F     889         LDX  #15       ; GO DOWN SOME LINES
F42F:85 02     890 DL120   STA  LWAIT
F431:CA        891         DEX
F432:D0 FB     892         BNE  DL120
F434:          893 * WE ARE NOW ON LINE 120
F434:          894 *
F434:A9 06     895         LDA  #6        ; SET PALYERS FOR TRIPLE IMAGE MODE
F436:85 04     896         STA  P1VMOD
F438:85 05     897         STA  P2VMOD
F43A:          898 *
F43A:          899 *
F43A:          900 * ALL TIMING IN THE FOLLOWING IS CRITICAL
F43A:          901 *
F43A:A5 E6     902         LDA  TP1       ; GET HORIZONTAL TIME PARAMETER
F43C:25 0F     903         AND  $0F       ; LOOK AT LOWER 4 BITS
F43E:AA        904         TAX            ; SAVE IN X
F43F:85 02     905         STA  LWAIT     ; GET SET
F441:CA        906 HFLP3   DEX            ; USE UP TIME
F442:10 FD     907         BPL  HFLP3
F444:          908 *
F444:85 10     909         STA  P1HRES    ; SET STOP FOR PLAYER1
F446:85 11     910         STA  P2HRES    ; SET STOP FOR PLAYER2
F448:          911 *
F448:85 02     912         STA  LWAIT     ; GO TO NEXT LINE
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F44A:85 2A     913         STA  HZSCRL    ; ADD THE FINE OFFSETS
F44C:          914 *
F44C:          915 *
F44C:          916 *
F44C:          917 *
F44C:A2 00     918         LDX  #0        ; START OF LOOP COUNT
F44E:          919 *
F44E:          920 *
F44E:          921 * HERE IS THE MAIN LOOP
F44E:          922 D48LP   EQU  *
F44E:85 02     923         STA  LWAIT     ; WAIT FOR START OF LINE
F450:          924 *
F450:B5 B3     925         LDA  P1IMG,X   ; GET FIRST PART       (4 CYCLES)
F452:85 1B     926         STA  P1IMAG    ; PUT IN SHIFTER       (3 CYCLES)
F454:85 30     927         STA  $30       ; BURN 13 CYCLES
F456:EA        928         NOP
F457:EA        929         NOP
F458:EA        930         NOP
F459:EA        931         NOP
F45A:EA        932         NOP
F45B:B5 BB     933         LDA  P2IMG,X   ; GET THE SECOND PART  (4 CYCLES)
F45D:85 1C     934         STA  P2IMAG    ; PUT IN THE OTHER SHIFTER (3 CYCLES)
F45F:          935 *
F45F:B5 C4     936         LDA  OBJAIM,X  ; GET THE THIRD PART   (4 CYCLES)
F461:          937 *
F461:85 1B     938         STA  P1IMAG    ; REUSE SHIFTER        (3 CYCLES)
F463:B5 CD     939         LDA  OBJBIM,X  ; THE NEXT PART        (4 CYCLES)
F465:85 1C     940         STA  P2IMAG    ; PUT IT UP            (3 CYCLES)
F467:B5 D6     941         LDA  OBJCIM,X  ; GET THE FIFTH PART   (4 CYCLES)
F469:85 1B     942         STA  P1IMAG    ; PUT IT UP            (3 CYCLES)
F46B:B5 DE     943         LDA  OBJXIM,X  ; GET LAST PART        (4 CYCLES)
F46D:          944 *
F46D:85 1C     945         STA  P2IMAG    ; PUT THAT UP          (3 CYCLES)
F46F:          946 *
F46F:E8        947         INX             ; INCREMENT COUNT      (2 CYCLES)
F470:          948 *
F470:          949 *
F470:          950 *
F470:E0 08     951         CPX  #8        ; SEE IF DONE          (2 CYCLES)
F472:90 DA     952         BCC  D48LP     ; LOOP TILL 8 LINES DONE (3 CYCLES IF BRANCH TAKEN)
F474:          953 *
F474:85 02     954         STA  LWAIT     ; GO TO NEXT LINE
F476:A9 00     955         LDA  #0        ; CLEAR OUT IMAGES
F478:85 1B     956         STA  P1IMAG
F47A:85 1C     957         STA  P2IMAG
F47C:          958 *
F47C:          959 * THIS PUTS US AT LINE 116
F47C:          960 *
F47C:          961 * WE NOW DO THE SAME THING BUT THIS TIME WE WILL NOT USE LWAIT AND
F47C:          962 * WE HAVE PLACED A GENERAL STORE INSTRUCTION IN THE FRONT OF THE LOOP
F47C:          963 * SO WE CAN USE XCONTROL TO CHOOSE REGISTERS AND VALUES TO STORE
F47C:          964 * WHILE THE LOOP IS RUNNING.
F47C:          965 *
F47C:          966 *
F47C:          967 *
F47C:          968 *
F47C:A4 E7     969         LDY  TP25      ; PAGE 0 ADDRESS OF WHERE TO DO A STORE
F47E:A2 00     970         LDX  #0        ; RESET INDEX
F480:85 02     971         STA  LWAIT
F482:          972 *
F482:          973 * NOW A LOOP JUST AS ABOVE, EXCEPT NO STORES TO LWAIT
F482:          974 *
F482:          975 *
F482:          976 * HERE IS THE MAIN LOOP
F482:          977 D48LP2  EQU  *
F482:B5 B3     978         LDA  P1IMG,X   ; GET FIRST PART       (4 CYCLES)
F484:85 1B     979         STA  P1IMAG    ; PUT IN SHIFTER       (3 CYCLES)
F486:A5 E8     980         LDA  TP26      ; GET WHAT TO STORE    (3 CYCLES)
F488:99 00 00  981         STA  $0000,Y   ; STORE IT             (5 CYCLES)
F48B:85 30     982         STA  $30       ; BURN 5 CYCLES
F48D:EA        983         NOP
F48E:B5 BB     984         LDA  P2IMG,X   ; GET THE SECOND PART  (4 CYCLES)
F490:85 1C     985         STA  P2IMAG    ; PUT IN THE OTHER SHIFTER (3 CYCLES)
F492:          986 *
F492:B5 C4     987         LDA  OBJAIM,X  ; GET THE THIRD PART   (4 CYCLES)
F494:          988 *
F494:85 1B     989         STA  P1IMAG    ; REUSE SHIFTER        (3 CYCLES)
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F496:B5 CD     990         LDA  OBJBIM,X  ; THE NEXT PART        (4 CYCLES)
F498:85 1C     991         STA  P2IMAG    ; PUT IT UP            (3 CYCLES)
F49A:B5 D6     992         LDA  OBJCIM,X  ; GET THE FIFTH PART   (4 CYCLES)
F49C:85 1B     993         STA  P1IMAG    ; PUT IT UP            (3 CYCLES)
F49E:B5 DE     994         LDA  OBJXIM,X  ; GET LAST PART        (4 CYCLES)
F4A0:          995 *
F4A0:85 1C     996         STA  P2IMAG    ; PUT THAT UP          (3 CYCLES)
F4A2:          997 *
F4A2:EA        998         NOP            ; BURN 14 CYCLES
F4A3:EA        999         NOP
F4A4:EA       1000         NOP
F4A5:EA       1001         NOP
F4A6:EA       1002         NOP
F4A7:EA       1003         NOP
F4A8:EA       1004         NOP
F4A9:E8       1005         INX             ; INCREMENT COUNT      (2 CYCLES)
F4AA:         1006 *
F4AA:         1007 *
F4AA:         1008 *
F4AA:E0 08    1009         CPX  #8        ; SEE IF DONE          (2 CYCLES)
F4AC:90 D4    1010         BCC  D48LP2    ; LOOP TILL 8 LINES DONE (3 CYCLES IF BRANCH TAKEN)
F4AE:         1011 *
F4AE:A9 00    1012         LDA  #0        ; CLEAR OUT IMAGES
F4B0:85 1B    1013         STA  P1IMAG
F4B2:85 1C    1014         STA  P2IMAG
F4B4:85 02    1015         STA  LWAIT
F4B6:         1016 *
F4B6:         1017 *
F4B6:         1018 *
F4B6:         1019 *
F4B6:         1020 * EXPERIMENT 5, HRES TIMING
F4B6:         1021 *
F4B6:         1022 * THIS IS JUST THE SAME AS EXPERIMENT 1, BUT WE HAVE PUT IN ONE NOP
F4B6:         1023 * THIS SHOWS THE EFFECT OF 2 CYCLES ON THE HRES TIMING
F4B6:         1024 *
F4B6:         1025 *
F4B6:A9 00    1026         LDA  #0        ; SET PLAYER FOR SINGLE IMAGE MODE
F4B8:85 04    1027         STA  P1VMOD
F4BA:A5 89    1028         LDA  P1HS      ; SET H SETTING
F4BC:4A       1029         LSR  A         ; GET COURSE BITS
F4BD:4A       1030         LSR  A
F4BE:4A       1031         LSR  A
F4BF:4A       1032         LSR  A
F4C0:18       1033         CLC            ; COURSE POSITION STARTS AT 4
F4C1:69 04    1034         ADC  #4        ; SO BACK IT UP
F4C3:AA       1035         TAX            ; SAVE IN X
F4C4:A5 89    1036         LDA  P1HS      ; GET HORIZONTAL SHADOW
F4C6:0A       1037         ASL  A         ; MOVE TO HIGH NIBBLE
F4C7:0A       1038         ASL  A
F4C8:0A       1039         ASL  A
F4C9:0A       1040         ASL  A
F4CA:49 70    1041         EOR  #$70      ; MAKE NUMBERS GO FROM LEFT TO RIGHT
F4CC:85 20    1042         STA  P1HORZ    ;  FINE OFFSET
F4CE:85 02    1043         STA  LWAIT     ; WAIT FOR END OF LINE
F4D0:EA       1044         NOP
F4D1:CA       1045 HFP3    DEX            ; SELECT CORSE POSITION BY THE TIME IN THIS LOOP
F4D2:10 FD    1046         BPL  HFP3
F4D4:85 10    1047         STA  P1HRES    ; THIS IS THE COURSE SETTING PROCESS
F4D6:         1048 *
F4D6:         1049 * NOW CAUSE THE HORZ INC TO BE ADDED TO THE ABSOLUTE POSITION
F4D6:85 02    1050         STA  LWAIT     ; GET TO END OF LINE
F4D8:85 2A    1051         STA  HZSCRL    ; ADD INCREMENT
F4DA:         1052 *
F4DA:         1053 *
F4DA:A2 00    1054         LDX  #0        ; INDEX TO PLAYER IMAGE
F4DC:85 02    1055 IMLP3   STA  LWAIT     ; WAIT TILL NEXT LINE
F4DE:B5 B3    1056         LDA  P1IMG,X   ; GET LINE OF PLAYER IMAGE
F4E0:85 1B    1057         STA  P1IMAG    ; PUT OUT TO REGISTER
F4E2:E8       1058         INX
F4E3:E0 08    1059         CPX  #8        ; SEE IF DONE
F4E5:90 F5    1060         BCC  IMLP3     ; IF NOT GO DO ANOTHER LINE
F4E7:85 02    1061         STA  LWAIT     ; FINISH THE LINE
F4E9:A9 00    1062         LDA  #0
F4EB:85 1B    1063         STA  P1IMAG    ; TURN OFF PLAYER
F4ED:         1064 *
F4ED:         1065 *
F4ED:         1066 *
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F4ED:          1067 *
F4ED:          1068 *
F4ED:          1069 * THE LAST EXPERIMENT SHOWS THE RESULT OF COMBINING STORES TO HRES AND
F4ED:          1070 * THE IMAGE REGISTER  (I.E. NOTHING)
F4ED:          1071 *
F4ED:          1072 *
F4ED:A2 00     1073          LDX  #0        ; INDEX TO PLAYER IMAGE
F4EF:85 02     1074 IMLP4    STA  LWAIT     ; WAIT TILL NEXT LINE
F4F1:B5 B3     1075          LDA  P1IMG,X   ; GET LINE OF PLAYER IMAGE
F4F3:85 1B     1076          STA  P1IMAG    ; PUT OUT TO REGISTER
F4F5:EA        1077          NOP            ; BURN 14 CYCLES
F4F6:EA        1078          NOP
F4F7:EA        1079          NOP
F4F8:EA        1080          NOP
F4F9:EA        1081          NOP
F4FA:EA        1082          NOP
F4FB:EA        1083          NOP
F4FC:85 10     1084          STA  P1HRES    ; REPOSITION PLAYER
F4FE:EA        1085          NOP            ; WAIT 4 CYCLES
F4FF:EA        1086          NOP
F500:85 10     1087          STA  P1HRES    ; REPOSITION
F502:85 1B     1088          STA  P1IMAG    ; TRY TO DISPLAY
F504:85 10     1089          STA  P1HRES    ; REPOSITION
F506:E8        1090          INX
F507:E0 08     1091          CPX  #8        ; SEE IF DONE
F509:90 E4     1092          BCC  IMLP4     ; IF NOT GO DO ANOTHER LINE
F50B:85 02     1093          STA  LWAIT     ; FINISH THE LINE
F50D:A9 00     1094          LDA  #0
F50F:85 1B     1095          STA  P1IMAG    ; TURN OFF PLAYER
F511:          1096 *
F511:          1097 *
F511:          1098 *
F511:          1099 * DONE SO WAIT THE REST OF THE SCREEN
F511:A2 74     1100          LDX  #116      ; WAIT THE REST OF THE SCREEN
F513:85 02     1101 DWAIT    STA  LWAIT
F515:CA        1102          DEX
F516:D0 FB     1103          BNE  DWAIT
F518:          1104 *
F518:          1105 *
F518:          1106 *
F518:          1107 * NOW AT LINE 255 SO CALL HSYNCH
F518:20 4B F2  1108          JSR  SYNCH
F51B:4C 36 F3  1109          JMP  DISPLAY2  ; LOOP BACK
F51E:          1110 *
F51E:          1111 *
F51E:          1112 * NOW DATA FOR THE IMAGES
F51E:          1113 *
F51E:FF 63 F8  1114 FROB1    DFB  $FF,$63,$F8,$F8,$60,$60,$F0,$F0
F521:F8 60 60
F524:F0 F0
F526:FC 62 62  1115 FROB2    DFB            $FC,$62,$62,$7C,$78,$6C,$66,$E3
F529:7C 78 6C
F52C:66 E3
F52E:3C 7E C3  1116 FROB3    DFB  $3C,$7E,$C3,$C3,$C3,$C3,$7E,$3C
F531:C3 C3 C3
F534:7E 3C
F536:FC 62 62  1117 FROB4    DFB  $FC,$62,$62,$7C,$7C,$62,$62,$FC
F539:7C 7C 62
F53C:62 FC
F53E:FF FF 00  1118 FROB5    DFB  $FF,$FF,$00,$1C,$3C,$20,$3C,$1C
F541:1C 3C 20
F544:3C 1C
F546:FF FF 00  1119 FROB6    DFB  $FF,$FF,$00,$18,$3C,$24,$3C,$18
F549:18 3C 24
F54C:3C 18
F54E:          1120 *
F54E:          1121 *
F54E:          1122 *

\007*** SUCCESSFUL ASSEMBLY: NO ERRORS
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 F0AE AIMLP        FFF0 AR1          FFF1 AR2          FFF2 AR3
   09 BCOLOR       F0BA BIMLP          AD BKCR         F0C6 CIMLP
 F008 CLOOP      ?  2C COLRES          84 COMCOD       F30D CPLP
?0280 CTROLS       F44E D48LP        F482 D48LP2     ?0281 DDRA
?0283 DDRB           87 DIGCON       F114 DISPLAY      F336 DISPLAY2
 F42F DL120        F3D8 DMLP1        F3F8 DMLP2      ?F2AD DOREAD
 F121 DOUBLE       F513 DWAIT          A8 EBITS        F22C ENDLP
   0D FLDAIM         0E FLDBIM         0F FLDCIM       F275 FMON
 F51E FROB1        F526 FROB2        F52E FROB3        F536 FROB4
 F53E FROB5        F546 FROB6          0A FVMODE       F342 HANGIN
 F441 HFLP3        F380 HFP1         F3B6 HFP2         F4D1 HFP3
   2A HZSCRL       F38B IMLP1        F3C1 IMLP2        F4DC IMLP3
 F4EF IMLP4        F1D9 IMP2         F1F3 INOA         F20D INOB
 F227 INOC         F1BF INP1         F28C L1           F298 L2
 F2A1 L3           F088 LETA        ?F082 LETB         F090 LETB8
 F098 LETC         F070 LETF        ?F07C LETO        ?F076 LETR
?  3C LFTFR       F361 LN60         F237 LPDONE         02 LWAIT
 F0EC MAIN           A6 MODE1          A7 MODE2        F1EF NOA
 F209 NOB          F28B NOCOM        F223 NOC        ?  2B NOINC
 F1BB NOP1         F1D5 NOP2         F1F6 OADSP        F1DE OATST
 F210 OBDSP          C4 OBJAIM         C3 OBJAVT         CD OBJBIM
   CC OBJBVT         D6 OBJCIM         AE OBJCR          D5 OBJCVT
   DE OBJXIM       F1F8 OBTST        F22A OCDSP          08 OCOLOR
 F212 OCTST          06 P1COLOR        AB P1CR         ?  25 P1DELAY
 F1C2 P1DSP      ?  0B P1FLIP          20 P1HORZ           10 P1HRES
   89 P1HS           1B P1IMAG         B3 P1IMG        ?  32 P1OCOL
   1D P1SHOT         AF P1VERT         04 P1VMOD           07 P2COLOR
   AC P2CR         ?  26 P2DELAY     F1DC P2DSP        ?  0C P2FLIP
   21 P2HORZ         11 P2HRES         8A P2HS             1C P2IMAG
   BB P2IMG        ?  33 P2OCOL        1E P2SHOT       F1C4 P2TST
   B0 P2VERT         05 P2VMOD       ?F179 PART2       ?  38 PDL5L
?  3A PDL5R        ?  39 PDL9L       ?  3B PDL9R       ?  37 PPCOL
?  30 PS1COL       ?  31 PS2COL        F2A4 READOK       F2C7 READ
?  3D RGHFR         F2E0 RL1           F2E3 RL2          0284 RTIME
 F2E8 RXT        ?  28 S1CONT          22 S1HORZ       ?  12 S1HRES
   8B S1HS         ?  34 S1OCOL        B1 S1VERT       ?  29 S2CONT
   23 S2HORZ       ?  13 S2HRES        8C S2HS         ?  35 S2OCOL
   B2 S2VERT       ?  24 S3HORZ      ?  14 S3HRES      ?  36 S3OCOL
?  1F S3SHOT         80 SCREENS        81 SECONDS        F2B6 SETADDR
 F30B SINGLE       F19B SLOOP          A5 SMODE        ?  19 SND1AM
?  15 SND1MD       ?  17 SND1TN      ?  1A SND2AM      ?  16 SND2MD
?  18 SND2TN          86 SPREG         AA SPTS           F0FB SSETUP
 F000 START        F356 STWAIT       ?0282 SWTCHS        F257 SYN1
 F24B SYNCH          83 TARH           82 TARL             E9 TEMP1
?  EA TEMP2       ?0294 TIM1        ?0297 TIM1024       0296 TIM64
?0295 TIM8         F0A0 TINIT         F0A2 TLP             A9 TMCNT
   88 TOPCON       F13E TOPLP        F137 TOPWT          E6 TP1
   E7 TP25           E8 TP26           8D TREG1          93 TREG2
   99 TREG3          9F TREG4        F125 TWAIT        ?  03 VID03
?  27 VID27        ?  2D VID2D       ?  2E VID2E       ?  2F VID2F
?  3E VID3E        ?  3F VID3F         85 VLNCT          F424 VLP
   01 VRESET         00 VSYNCH       F302 WL1            F305 WL2
 F2AE WRITEOK      F2E9 WRITE        F30A WXT            F3DC YWAIT1
 F3FC YWAIT2
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   00 VSYNCH          01 VRESET          02 LWAIT        ?  03 VID03
   04 P1VMOD          05 P2VMOD          06 P1COLOR         07 P2COLOR
   08 OCOLOR          09 BCOLOR          0A FVMODE       ?  0B P1FLIP
?  0C P2FLIP          0D FLDAIM          0E FLDBIM          0F FLDCIM
   10 P1HRES          11 P2HRES       ?  12 S1HRES       ?  13 S2HRES
?  14 S3HRES       ?  15 SND1MD       ?  16 SND2MD       ?  17 SND1TN
?  18 SND2TN       ?  19 SND1AM       ?  1A SND2AM          1B P1IMAG
   1C P2IMAG          1D P1SHOT          1E P2SHOT       ?  1F S3SHOT
   20 P1HORZ          21 P2HORZ          22 S1HORZ          23 S2HORZ
?  24 S3HORZ       ?  25 P1DELAY      ?  26 P2DELAY      ?  27 VID27
?  28 S1CONT       ?  29 S2CONT          2A HZSCRL       ?  2B NOINC
?  2C COLRES       ?  2D VID2D        ?  2E VID2E        ?  2F VID2F
?  30 PS1COL       ?  31 PS2COL       ?  32 P1OCOL       ?  33 P2OCOL
?  34 S1OCOL       ?  35 S2OCOL       ?  36 S3OCOL       ?  37 PPCOL
?  38 PDL5L        ?  39 PDL9L        ?  3A PDL5R        ?  3B PDL9R
?  3C LFTFR        ?  3D RGHFR        ?  3E VID3E        ?  3F VID3F
   80 SCREENS         81 SECONDS         82 TARL            83 TARH
   84 COMCOD          85 VLNCT           86 SPREG           87 DIGCON
   88 TOPCON          89 P1HS            8A P2HS            8B S1HS
   8C S2HS            8D TREG1           93 TREG2           99 TREG3
   9F TREG4           A5 SMODE           A6 MODE1           A7 MODE2
   A8 EBITS           A9 TMCNT           AA SPTS            AB P1CR
   AC P2CR            AD BKCR            AE OBJCR           AF P1VERT
   B0 P2VERT          B1 S1VERT          B2 S2VERT          B3 P1IMG
   BB P2IMG           C3 OBJAVT          C4 OBJAIM          CC OBJBVT
   CD OBJBIM          D5 OBJCVT          D6 OBJCIM          DE OBJXIM
   E6 TP1             E7 TP25            E8 TP26            E9 TEMP1
?  EA TEMP2        ?0280 CTROLS       ?0281 DDRA         ?0282 SWTCHS
?0283 DDRB          0284 RTIME         ?0294 TIM1         ?0295 TIM8
 0296 TIM64        ?0297 TIM1024       F000 START         F008 CLOOP
 F070 LETF         ?F076 LETR         ?F07C LETO         ?F082 LETB
 F088 LETA          F090 LETB8         F098 LETC          F0A0 TINIT
 F0A2 TLP           F0AE AIMLP         F0BA BIMLP         F0C6 CIMLP
 F0EC MAIN          F0FB SSETUP        F114 DISPLAY       F121 DOUBLE
 F125 TWAIT         F137 TOPWT         F13E TOPLP        ?F179 PART2
 F19B SLOOP         F1BB NOP1          F1BF INP1          F1C2 P1DSP
 F1C4 P2TST         F1D5 NOP2          F1D9 IMP2          F1DC P2DSP
 F1DE OATST         F1EF NOA           F1F3 INOA          F1F6 OADSP
 F1F8 OBTST         F209 NOB           F20D INOB          F210 OBDSP
 F212 OCTST         F223 NOC           F227 INOC          F22A OCDSP
 F22C ENDLP         F237 LPDONE        F24B SYNCH         F257 SYN1
 F275 FMON          F28B NOCOM         F28C L1            F298 L2
 F2A1 L3            F2A4 READOK       ?F2AD DOREAD        F2AE WRITEOK
 F2B6 SETADDR       F2C7 READ          F2E0 RL1           F2E3 RL2
 F2E8 RXT           F2E9 WRITE         F302 WL1           F305 WL2
 F30A WXT           F30B SINGLE        F30D CPLP          F336 DISPLAY2
 F342 HANGIN        F356 STWAIT        F361 LN60          F380 HFP1
 F38B IMLP1         F3B6 HFP2          F3C1 IMLP2         F3D8 DMLP1
 F3DC YWAIT1        F3F8 DMLP2         F3FC YWAIT2        F424 VLP
 F42F DL120         F441 HFLP3         F44E D48LP         F482 D48LP2
 F4D1 HFP3          F4DC IMLP3         F4EF IMLP4         F513 DWAIT
 F51E FROB1         F526 FROB2         F52E FROB3         F536 FROB4
 F53E FROB5         F546 FROB6         FFF0 AR1           FFF1 AR2
 FFF2 AR3
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